

## **Abstract**

Disclosed is a method and apparatus for optically modulating and transmitting source data. An  
5 optical comb comprising optical tones having a frequency spacing equal to  $\Delta f$  is generated by an optical comb generator. Selected ones of the optical tones in the optical comb are modulated according to the source data to produce a comb of modulated optical tones. At least one optical tone in the optical comb is frequency shifted by a frequency less than  $\Delta f$  to produce a frequency shifted unmodulated optical reference tone. The optical comb, the frequency shifted unmodulated  
10 optical reference tone and the comb of modulated tones are multiplexed onto at least one optical path.